

Amendments to the Claims

This listing of the claims will replace all prior versions, and listings, of claims in the application:

List of Claims

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Previously Cancelled)
6. (Cancelled)
7. (Cancelled)
8. (Cancelled)
9. (Cancelled)
10. (Previously Cancelled)
11. (Previously Cancelled)
12. (Cancelled)
13. (Previously Cancelled)
14. (Previously Cancelled)
15. (Previously Cancelled)

16. (Currently Amended) A wafer carrier assembly for use in a chemical mechanical polishing system, comprising:
- wafer carrier support frame;
 - wafer carrier head housing rotatably mounted on said wafer carrier support frame;
 - wafer carrier head base;
 - compartmentalized flexible membrane coupled to the wafer carrier base and defining a plurality of concentric chambers;
 - a retaining ring, operatively connected to a retaining ring bearing which allows relative axial motion while constraining relative radial motion between said retaining ring and said wafer carrier head housing;
 - a retaining ring bellows operatively connected to said retaining ring bearing to urge said retaining ring against a polishing member; and
 - a bladder bellows operably connecting said wafer carrier head base to said wafer carrier head housing such that rotational torque is transferred from said wafer carrier head housing to said wafer carrier head base;
 - a chamber formed by said bladder bellows, said wafer carrier head base, and said wafer carrier head housing may be pressurized to load said wafer carrier head base and compartmentalized flexible membrane against the polishing member, independent of any frictional loads on said retaining ring, wherein the compartmentalized flexible membrane has a lower surface providing a wafer receiving surface with a plurality of inner portions associated with respective ones of said plurality of concentric chambers such that pressures within each of said chambers are independently controllable; and
- ~~The wafer carrier assembly of claim 1 further comprising:~~
- a plurality of concentric rigid supports coupled to said wafer carrier head base, wherein the compartmentalized flexible membrane has a plurality of concentric flanges coupled to said plurality of concentric rigid supports to define a plurality of concentric chambers.

17. (Currently Amended) The wafer carrier assembly of claim 1 further comprising:

a ~~second~~ flexible member between the plurality of concentric rigid supports and the wafer carrier head base to, ~~and said plurality of concentric rigid supports are coupled to said second flexible member; wherein said wafer carrier base is provided with a plurality of concentric channels and defines a~~ the plurality of concentric chambers in ~~with said second~~ flexible member.

18. (Currently Amended) The wafer carrier assembly of claim 17 further comprising means for independently controlling pressures within said plurality concentric chambers defined by said wafer carrier base and said ~~said second~~ flexible member.
19. (Currently Amended) A wafer carrier assembly for use in a chemical mechanical polishing system, comprising:
wafer carrier support frame;
wafer carrier head housing rotatably mounted on said wafer carrier support frame;
wafer carrier head base;
compartmentalized flexible membrane coupled to the wafer carrier head base and defining a plurality of concentric chambers;
a retaining ring, operatively connected to a retaining ring bearing which allows relative axial motion while constraining relative radial motion between said retaining ring and said wafer carrier head housing;
a retaining ring bellows operatively connected to said retaining ring bearing to urge said retaining ring against a polishing member; and
a bladder bellows operably connecting said wafer carrier head base to said wafer carrier head housing such that rotational torque is transferred from said wafer carrier head housing to said wafer carrier head base;
a chamber formed by said bladder bellows, said wafer carrier head base, and said wafer carrier head housing may be pressurized to load said wafer carrier head base and compartmentalized flexible membrane against the polishing member, independent of any frictional loads on said retaining ring, wherein the compartmentalized flexible membrane has a lower surface providing a wafer

receiving surface with a plurality of inner portions associated with respective ones of said plurality of concentric chambers such that pressures within each of said chambers are independently controllable; and

~~The wafer carrier assembly of claim 1 further comprising:~~

a plurality of concentric tubular rings that ~~between the wafer carrier head base and the~~ compartmentalized the flexible membrane into ~~define the~~ said plurality of concentric chambers.

20. (Previously Added) The wafer carrier assembly of claim 19 wherein each of ~~the~~ said plurality of concentric tubular rings is provided with at least a pair of restrictors so that one of ~~the~~ said plurality concentric chambers is in fluid communication with a neighboring concentric chamber.
21. (New) The wafer carrier assembly of claim 19, wherein said restrictors are inter-chamber restrictors.
22. (New) The wafer carrier assembly of claim 21, wherein said inter-chamber restrictors are tubing.
23. (New) The wafer carrier assembly of claim 21, wherein said inter-chamber restrictors provide flow resistance higher than the passageway into said concentric chambers from the pressure regulators.
24. (New) The wafer carrier assembly of claim 21, wherein each said inter-chamber restrictors provides equal flow restriction.
25. (New) The wafer carrier assembly of claim 19, wherein pressure in each of said concentric chamber is maintained through an active control system.
26. (New) The wafer carrier assembly of claim 20, wherein said restrictors allows pressure within each tubular ring to be an average of two adjacent said concentric chambers.
27. (New) The wafer carrier assembly of claim 17, wherein said wafer carrier head base is a bias plate.

28. (New) A wafer carrier head for chemical mechanical polishing comprising:
a wafer head housing;
a bias plate comprising concentric channels;
a flexible member mounted to the underside of the bias plate such that the bias plate channels form a compartmentalized concentric chamber in the bias plate; and
a flexible membrane comprising compartmentalized concentric chambers defined by chamber sidewalls that mount against the underside of the flexible member.
29. (New) The wafer carrier head of Claim 28, wherein the chamber sidewalls are connected to rigid supports.
30. (New) The wafer carrier head of Claim 29, wherein the rigid supports comprise concentric rings.
31. (New) The wafer carrier head of Claim 28, wherein the concentric chambers in the bias plate control the pressure exerted on the rigid supports.
32. (New) The wafer carrier head of Claim 28, wherein the concentric chambers in the bias plate are adjustable to maintain a smooth transition between adjacent membrane compartments.
33. (New) The wafer head of Claim 28, wherein pressures in the concentric chambers of the flexible membrane are adjustable.
34. (New) The wafer head of Claim 28, wherein pressures in the concentric chambers of the bias plate are adjustable.
35. (New) The wafer head of Claim 28, wherein pressures in the concentric chambers of the flexible membrane and pressure in the concentric chambers of the bias plate are adjustable simultaneously.
36. (New) The wafer head of Claim 28, wherein said flexible membrane comprising compartmentalized concentric chambers further comprise a plurality of

concentric flanges coupled to the bias plate to define a plurality of concentric chambers.

37. (New) The wafer head of Claim 36, wherein said concentric flanges are secured in a first annular depression or groove on a bottom surface of bias plate.
38. (New) The wafer carrier assembly of claim 16, further comprising said plurality of concentric flanges coupled to said wafer carrier head base.
39. (New) The wafer carrier assembly of claim 38, wherein said plurality of concentric flanges are secured in a first annular depress or groove on a bottom surface of the wafer carrier head base.

Amendments to the Drawings

Figure 9A has been amended to point out "closed bladder 95" as shown in red on the attached figure. Support for "closed bladder 95" can be found on, for example, page 10, lines 16-26 and page 12, lines 7-17. Accordingly, no new matter has been added.

For the sake of clarity, a marked-up version is attached hereto.

Upon approval of the changes by the Examiner, Applicants will submit replacement drawing sheets that incorporate the proposed corrections.